

WHAT IS CLAIMED IS:

1. A process for joining a steel to a copper, comprising:
applying a copper-containing flash layer to at least a portion of a clean surface of the copper;
bringing the steel into direct contact with the flash layer; and
welding the steel to a portion of the at least a portion of the clean surface of the copper such that the heat of welding is localized to the surface of the copper and a metallurgical bond exists between at least a portion of the steel terminal and a portion of the copper electrode.
2. The process of claim 1, wherein the step of welding includes using an alternating current frequency in a range of at least 10 kHz to no greater than 100 kHz.
3. The process of claim 1, wherein the flash layer is selected from an alloy comprising silver and copper
4. The process of claim 3, wherein the alloy of the flash layer is selected to comprise copper in a range from 30 wt% to 70 wt%.
5. The process of claim 3, wherein the alloy of the flash layer is selected to comprise copper in a range from at least 50 wt% to 70 wt%.
6. The process of claim 4, wherein the alloy of the flash layer is selected to be a binary alloy.
7. The process of claim 1, wherein the copper is 99.999 wt% pure copper.

8. The process of claim 1, wherein the step of applying includes depositing a thickness of the flash layer in a range of at least 100 microns to no greater than 500 microns.

9. The process of claim 8, wherein the thickness of the flash layer is at least 150 microns.

10. The process of claim 1, wherein the step of welding includes applying the alternating current inductively.

11. The process of claim 1, wherein the steel is bent to shape from a flat strap.

12. The process of claim 1, wherein the copper is a copper electrode of a semiconductor device, and the heat of welding is localized to the surface such that the semiconductor device is undamaged by the process.

13. The process of claim 12, wherein the steel is a terminal.

14. The process of claim 13, wherein the steel is an alloy comprising nickel and iron.

15. The process of claim 14, wherein the steel is an alloy comprising about 42 wt% Fe, 0.8 wt% Cr, 1.2 wt% Mn and 1.7 wt% Mo.

16. The process of claim 14, wherein the step of welding includes applying an alternating current frequency in a range of at least 10 kHz to no greater than 100 kHz.

17. The process of claim 16, wherein the flash layer comprises an alloy of copper and silver.

18. The process of claim 17, wherein the alloy of the flash layer comprises copper in a range from 30 wt% to no greater than 70 wt%.

19. The process of claim 18, wherein the alloy of the flash layer comprises copper in a range from at least 50 wt%.

20. The process of claim 17, wherein the step of applying includes depositing a thickness of the flash layer in a range of at least 100 microns to no greater than 500 microns.

21. The process of claim 20, wherein the step of welding includes applying the alternating current inductively.